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TITLE: PACKET MULTIPLEX DEVICE/METHOD

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NEC CORP	N/A

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ABSTRACT:

PROBLEM TO BE SOLVED: To provide packet multiplex device/method, which can be miniaturized/ lightened, can reduce power consumption, can facilitate circuit/device constitution and can improve transmission efficiency.

SOLUTION: At the time of reading a variable length packet 106 from an accumulation buffer 101, the packet length 108 of a variable length packet header is set in a down counter 103. The remaining length of the packet during reading is always managed by decreasing the down counter 103 with the reading of variable length packet data, and the length is used as the first header pointer of a fixed length frame header.

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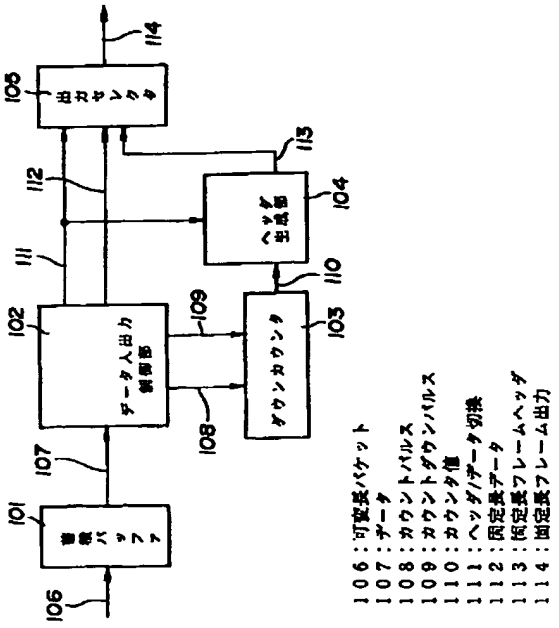
(54)【発明の名称】　パケット多重化装置及び方法

(57)【要約】

【課題】　本発明は、小型・軽量化、低消費電力化、回路・装置構成簡易化を実現し、かつ伝送効率の向上を図ることのできるパケット多重化装置及び方法を提供する。

【解決手段】　蓄積バッファ１０１からの可変長パケット１０６読み出し時に、可変長パケットヘッダのパケット長１０８をダウンカウンタ１０３にセットし、このダウンカウンタ１０３を可変長パケットデータ読み出しとともにデクリメントすることで、読み出し中のパケットの残り長さを常に管理しておき、これを固定長フレームヘッダの第１ヘッダポインタとして使用する。



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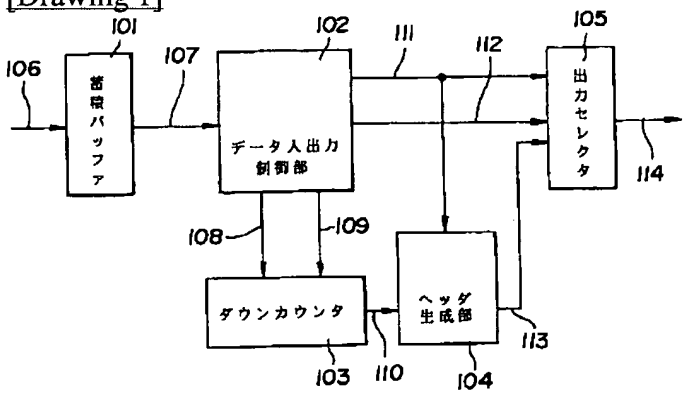
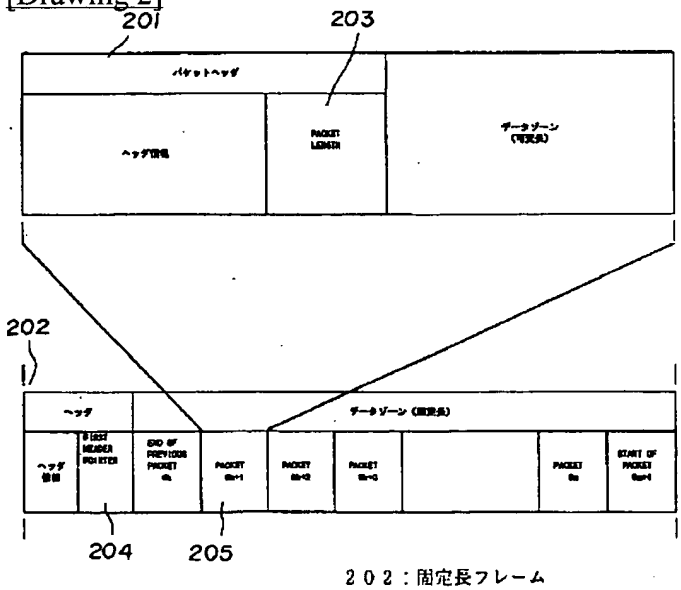
DRAWINGS

[Drawing 1]



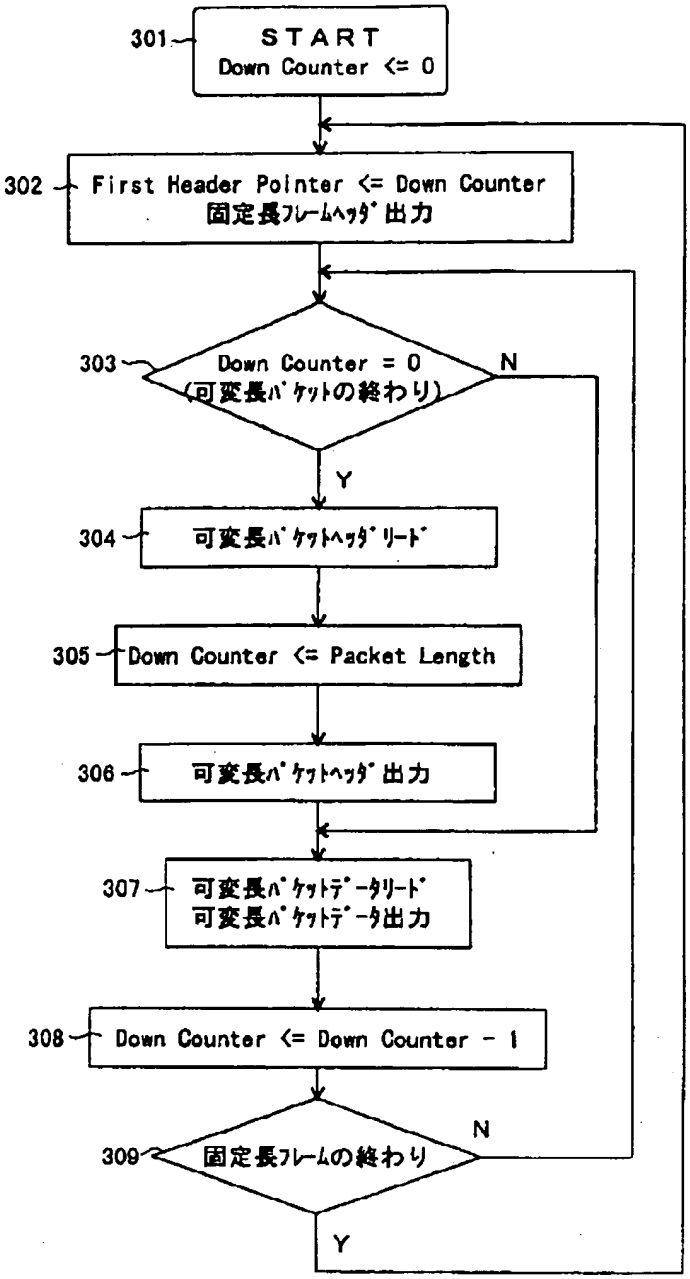
１０６：可変長パケット
１０７：データ
１０８：カウントパルス
１０９：カウントダウンパルス
１１０：カウンタ値
１１１：ヘッダ/データ切換
１１２：固定長データ
１１３：固定長フレームヘッダ
１１４：固定長フレーム出力

[Drawing 2]

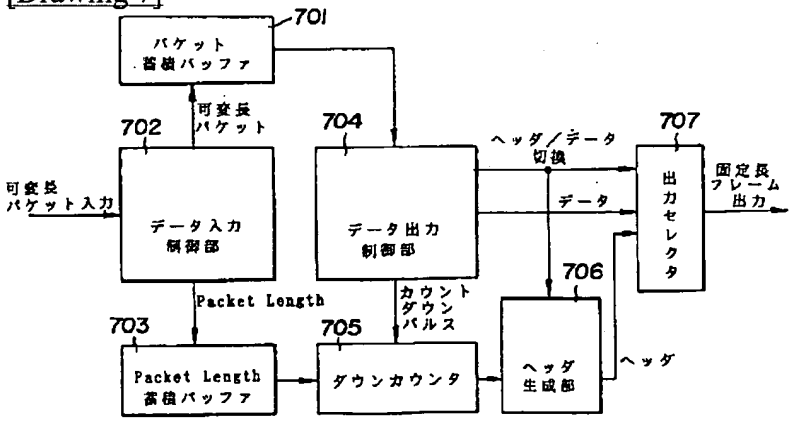


２０２：固定長フレーム

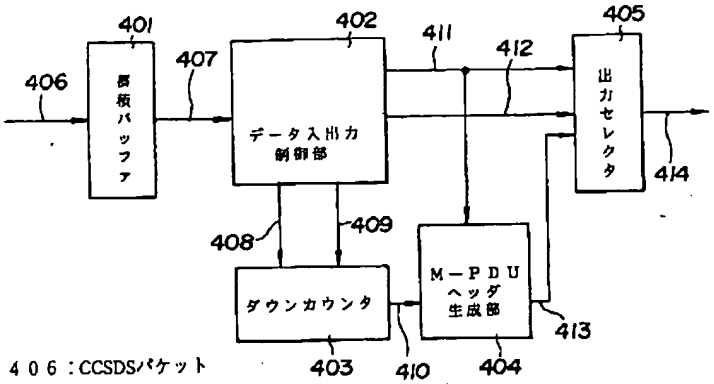
[Drawing 3]



[Drawing 7]

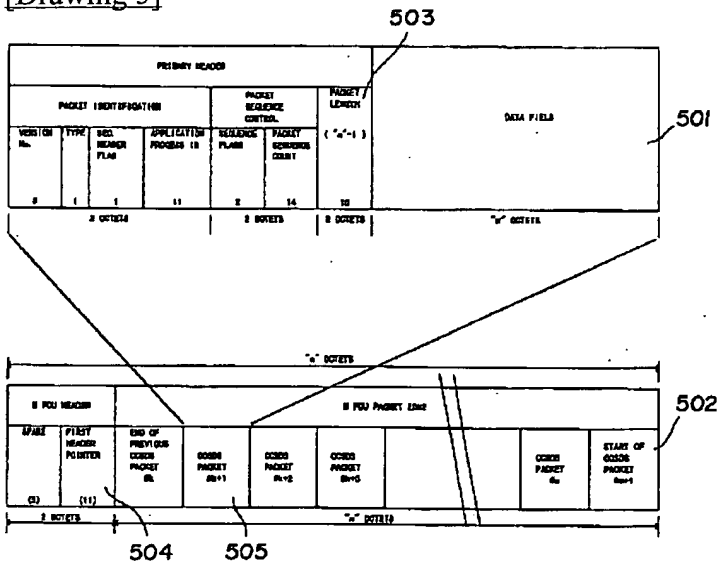


[Drawing 4]

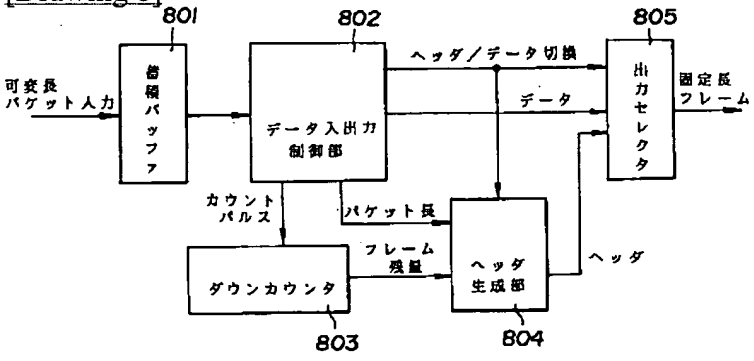


406：CCSDSパケット
407：データ
408：カウントパルス
409：カウントダウンパルス
410：カウンタ値
411：ヘッダ/データ切換信号
412：M_PDUデータ
413：M_PDUヘッダ
414：M_PDU

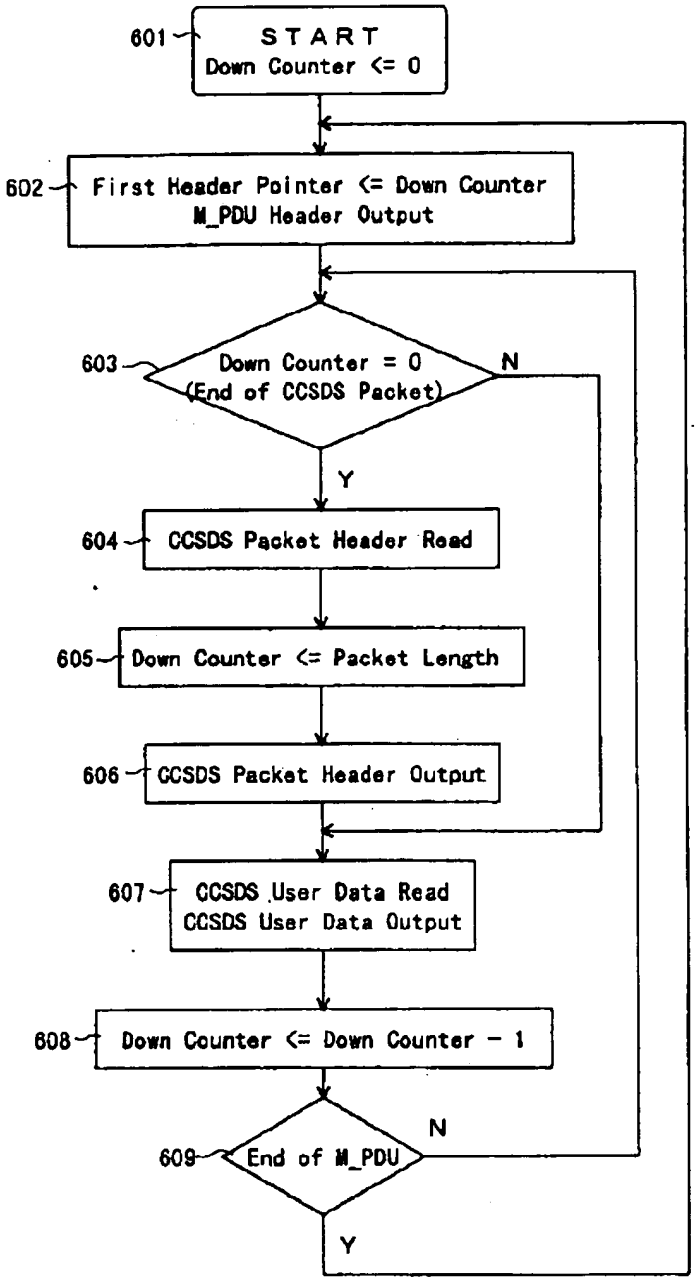
[Drawing 5]



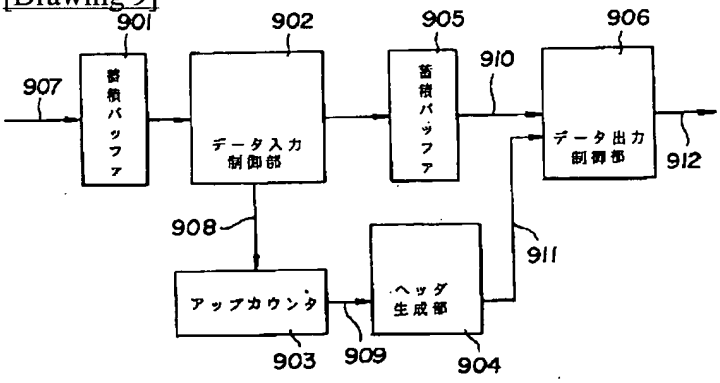
[Drawing 8]



[Drawing 6]



[Drawing 9]



907：可変長パケット
908：カウントアップパルス
909：カウント値
910：データ
911：固定長フレームヘッダ
912：固定長フレーム出力

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the packet multiplexer which is the 1st operation gestalt of this invention.
[Drawing 2] It is drawing showing an example which multiplexes a variable-length packet and generates a fixed-length frame.
[Drawing 3] It is a flow chart for explaining actuation of the packet multiplexer of the 1st operation gestalt.
[Drawing 4] It is the block diagram showing the M_PDU generation equipment which is the 2nd operation gestalt of this invention.
[Drawing 5] It is drawing showing an example which multiplexes a CCSDS packet and generates M_PDU.
[Drawing 6] It is a flow chart for explaining actuation of the M_PDU generation equipment of the 2nd operation gestalt.
[Drawing 7] It is the block diagram showing the packet multiplexer which is the 3rd operation gestalt of this invention.
[Drawing 8] It is the block diagram showing the packet multiplexer which is the 4th operation gestalt of this invention.
[Drawing 9] It is the block diagram showing an example of the conventional packet multiplexer.
[Description of Notations]
101 Are Recording Buffer
102 Data I/O Control Unit
103 Down Counter
104 Header Generation Section
105 Output Selector
201 Variable-length Packet
202 Fixed-length Frame
203 Packet Size
204 1st Header Pointer
401 Are Recording Buffer
402 Data I/O Control Unit
403 Down Counter
404 Header Generation Section
405 Output Selector
501 Variable-length Packet
502 Fixed-length Frame
503 Packet Size
504 1st Header Pointer
701 Packet Are Recording Buffer
702 Data Input Control Section
703 Packet Length Are Recording Buffer

704 Data Output Control Section
705 Down Counter
706 Header Generation Section
707 Output Selector
801 Are Recording Buffer
802 Data Input Control Section
803 Down Counter
804 Header Generation Section
805 Data Output Control Section
901 Are Recording Buffer
902 Data Input Control Section
903 Rise Counter
904 Header Generation Section
905 Are Recording Buffer
906 Data Output Control Section

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the equipment and the approach of multiplexing on the fixed-length frame which is used for packet communication, has the data length which was able to define beforehand the variable-length packet which has a header including packet size information, and has a header containing the 1st header pointer in which the location of the data of the beginning of a variable-length packet is shown.
[0002]
[Description of the Prior Art] Drawing 9 is the block diagram showing an example of the conventional packet multiplexer. In this drawing, the variable-length packet 907 is temporarily accumulated in the are recording buffer 901, and constant-rate [every] reading appearance is carried out by the data input control section 902. From the data input control section 902, the count up pulse 908 which shows the amount of read-out, i.e., a byte count, whenever reading appearance of the variable-length packet is carried out from the are recording buffer 901 is inputted into the rise counter 903, and counts up.
[0003] Reading appearance of the variable-length packet was carried out to the head of the header of the following variable-length packet 907, namely, when one variable-length packet 907 is read altogether, the counted value 909 of the rise counter 903 is outputted to the header generation section 904. The header generation section 904 generates the header of the fixed-length frame containing the 1st header pointer in which it is shown whether the head of the data of the beginning of a variable-length packet, i.e., the header of a variable-length packet, is located in which location of a fixed-length frame using this counted value 909.
[0004] After the data of the variable-length packet by which reading appearance was carried out are temporarily stored in another are recording buffer 905 on the other hand and the data of die length which fill the data zone of a fixed-length frame are stored in this are recording buffer 905, the fixed-length frame 912 is outputted with the fixed-length frame header 911 being first outputted from the data output control section 906, and subsequently data 910 being outputted.
[0005]
[Problem(s) to be Solved by the Invention] However, there was a trouble hung up over below in the conventional technique.
[0006] The 1st trouble is that another are recording buffer 905 for storing the data read from the are recording buffer 901 to the fixed-length frame header generate time other than the buffer 901 which accumulates the inputted variable-length packet is needed, and circuit magnitude becomes large in the Prior art shown in drawing 9 . The reason is that the data of a variable-length packet are still read and it is inside when a fixed-length frame header is created since the 1st header pointer is directly calculated from the amount of read-out of a variable-length packet.
[0007] The 2nd trouble is that the time delay from the input of a variable-length packet to the output of a fixed-length frame becomes large in the Prior art shown in drawing 9 . The reason is that it stores data in another are recording buffer 905 in order to generate a fixed-length frame header, after reading data from the packet are recording buffer 901.
[0008] The place which this invention is made in view of this trouble, and is made into the object is in

the point of offering the packet multiplexer and approach of being able to realize small and lightweight-izing, low-power-izing, and a circuit and equipment configuration simplification, and being able to make small the time delay of fixed-length frame creation, and aiming at improvement in transmission efficiency, by reducing the number of are recording buffers.
[0009]
[Means for Solving the Problem] The variable-length packet which has the header in which the summary of this invention includes packet size information is inputted. In the packet multiplexer multiplexed on the fixed-length frame which has a header containing the 1st header pointer in which the location of the data of the beginning of a variable-length packet is shown for this variable-length packet A packet read-out means by which a variable-length packet reads a variable-length packet from the buffer memory accumulated temporarily and buffer memory, An amount detection means of read-out to detect the amount of variable-length packet read-out by the packet read-out means, The packet size fetch means which takes out packet size information from the header of a variable-length packet, A header generation means to generate the header of the fixed-length frame which contains the 1st header pointer from the amount of variable-length packet read-out, and packet size information, It consists in the packet multiplexer characterized by having a fixed-length frame creation means to create a fixed-length frame by the variable-length packet by which reading appearance was carried out with the packet read-out means, and the header generated by the header generation means. The summary of this invention moreover, the variable-length packet which has a header including packet size information In the packet multiplexing approach multiplexed on the fixed-length frame which has a header containing the 1st header pointer in which the location of the data of the beginning of a variable-length packet is shown The amount of variable-length packet read-out of a variable-length packet is detected. Packet size information from the header of a variable-length packet Ejection, The header of the fixed-length frame which contains the 1st header pointer from the amount of variable-length packet read-out and packet size information is generated, and it consists in the packet multiplexing approach characterized by creating a fixed-length frame by the variable-length packet and the header.
[0010]
[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to a detail based on a drawing.
[0011] - The block diagram and drawing 2 which show the packet multiplexer whose 1st operation gestalt- drawing 1 is the 1st operation gestalt of this invention are principle drawing of multiplexing to a fixed-length frame from a variable-length packet.
[0012] As shown in drawing 1 , the variable-length packet 106 is inputted into the are recording buffer 101, and is temporarily accumulated in this are recording buffer 101. The output of the are recording buffer 101 is connected to data I/O control unit 102, and the variable-length packet accumulated in the are recording buffer 101 is read by the data input control section 102 considering the predetermined amount of read-out as a unit. A read-out unit changes with protocols and smallest units are 4octet(s) (= 32 bits) in CCSDS mentioned later at octet (= 8 bits) and TCP/IP.
[0013] Whenever data I/O control unit 102 has the counter which is not illustrated [which manages the capacity of the variable-length packet 106 accumulated in the are recording buffer 101] and the variable-length packet 106 is written in the are recording buffer 101, the increment of the counted value is carried out, and whenever the variable-length packet 106 is read from the are recording buffer 101, the decrement of the counted value is carried out. This data I/O control unit 102 extracts the packet size information 108 from the header of the variable-length packet 106 read from the are recording buffer 101, and outputs it to this down counter 103 as initial value of the down counter 103. Generally, although a packet size means the die length of a packet including a header, let the packet size be the die length (for a unit to be equal per above-mentioned read-out) -1 of a data zone by CCSDS like the after-mentioned. Moreover, data I/O control unit 102 generates the count down pulse 109 which shows that amount of read-out for every read-out of the data from the are recording buffer 101, this count down pulse 109 is inputted into the down counter 103, and the decrement of the counted value is carried out to it.
[0014] Furthermore, the fixed-length frame output 114 is connected to the output selector 105 which changes a header unit or data division, and data I/O control unit 102 inputs into an output selector 105

the data 107 read from the are recording buffer 101 as fixed length data 112. The change-over signal 111 of the header/data output of a fixed-length frame is generated by the data input control section 102, and is inputted into an output selector 105 and the header generation section 104.

[0015] It connects with the fixed-length frame header generation section 104, and the down counter 103 inputs the counter value 110 into the header generation section 104. It connects with the output selector 105 and the header generation section 104 inputs the generated fixed-length frame header 113 into an output selector 105.

[0016] Drawing 2 shows the principle which multiplexes the variable-length packet 201 to the fixed-length frame 202. The packet size information (Packet Length) 203 which shows the die length of data division is in the packet header at the variable-length packet 201. In case two or more variable-length packets 201 are multiplexed to the fixed-length frame 202, when the die length of the data division of the variable-length packet 201 is longer than the die length of the data division of the fixed-length frame 202, the variable-length packet 201 is divided into two or more fixed-length frames 202. There is the 1st header pointer (First Header Pointer) 204 in which the header location of the beginning of the variable-length packet 201 is shown in the header unit of the fixed-length frame 202. In the example of drawing 2 , the head location of "PACKET #k+1" 205 hits the 1st header pointer 204.

[0017] Next, actuation of the packet multiplexer of this operation gestalt is explained to a detail with reference to drawing 1 and drawing 3 , and the fixed-length frame header generation method using the down counter which is especially the description of this equipment is explained to a detail with reference to the flow chart of drawing 3 .

[0018] The packet multiplexers shown in drawing 1 are multiplex and equipment which divides, adds the fixed-length frame header 113 further, and is outputted as a fixed-length frame 114 about the inputted variable-length packet 106 at the fixed-length packet 112.

[0019] First, the variable-length packet 106 inputted from the outside is temporarily accumulated in the are recording buffer 101. If an accumulated dose crosses the data zone length of 1 fixed-length frame, data read-out from the are recording buffer 101 will be started by data I/O control unit 102.

[0020] At the time of equipment starting, the value of the down counter 103 is initialized to 0 (step 301). Thereby, the 1st header pointer can be set to 0 at the time of data read-out of the beginning (step 302).

[0021] Data I/O control unit 102 outputs the fixed-length frame header 113 with a header / data change-over signal 111 to the header generation section 104 and an output selector 105 in advance of data read-out from the are recording buffer 101. The fixed-length frame header 113 is generated by the header generation section 104, and the 1st header pointer is generated last time from the value of the down counter 103 at the time of fixed-length frame output termination (step 302).

[0022] After the output of a header 113, data I/O control unit 102 changes a header / data change-over signal 111 to data, and starts data read-out from the are recording buffer 101.